

REMARKS

Request for an Examiner's Interview

The Applicant and the Applicant's Attorney hereby request an interview with the Examiner in order to expedite the prosecution of this case.

Pending Claims

Claims 1-13 and 15-25 are pending. The Applicant respectfully requests reconsideration of claims 1-13 and 15-25 in light of the arguments presented herein.

Rejections under 35 U.S.C. §103 as Being Obvious

The rejections under 35 U.S.C. §103(a) made in the Office Action dated June 23, 2005 have been withdrawn in the Office Action dated February 23,, 2006. A new rational and a new ground of rejection have been made in the Office Action dated February 23,, 2006. Claims 1-25 are rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent 6,445,837 to Hanza (hereinafter "Hanza").

To be unpatentable under 35 U.S.C. §103(a), the differences between the subject matter sought to be patented and the prior art must be such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art. There must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify or combine the reference teachings. To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art.

Independent Claim 1 and Dependent Claims 2-15

The Office Action states that Hanza discloses a multi-source optical module comprising an optical circuit, a first lens, and a second lens as claimed. The Office Action also states that Hanza fails to specifically disclose the optical sources, the inputs and the lenses being positionable so that they are aligned. The Office Action further states that Hanza does, however, disclose creating a mask for precisely aligning the optical waveguides to the optical devices. The Office Action then concludes that, although it is not explicitly stated that the lenses are positionable so that they are aligned, it would have been obvious at the time the invention was made to a person having ordinary skill in the art to have the lenses be positionable so that they are aligned since Hanza discloses a mask to be created to perfectly align optical elements.

Claim 1 has been amended to more clearly define the invention. The Applicants have amended independent claim 1 to recite the limitation that the at least one of the first and the second lenses are positionable with a positioning member that is shaped to facilitate moving the lens with a positioning instrument so that the output of a respective one of the first and second optical sources and a respective one of the first and the second optical inputs of the optical circuit are aligned. This amendment is supported in paragraph 30 of the present specification. Claim 14, which includes a similar limitation, has been deleted.

Hanza describes a method and apparatus of precisely aligning optical waveguides to optical devices by detecting the exact position of mounted devices with an imaging system and then controlling a direct writing tool, such as a laser beam or an electronic beam, over the substrate based upon the exact known positions. The devices mounted in fixed locations are not moveable. An image processor recognizes the actual positions of devices on a substrate and then

transfers the pattern of the actual device positions to a computer-controlled electron beam lithography machine where a mask is created that will perfectly align the waveguides to the optical devices. Such a technique can achieve a very high accuracy alignment between optical waveguides and optical devices. See Hanza Column 3 lines 2-7.

It is well known that direct write lithography techniques, such as the techniques described in Hanza, can align patterns to fixed structures to within a small fraction of a micron. See, for example, Hanza column 6, lines 57-61. With such high alignment accuracy, there is no need for the positioning instrument claimed in independent claim 1 and described in the present application.

In fact, Hanza indicates in column 5, lines 45-49 that fine positioning instruments are not needed to position the optical devices on the substrate. In particular, Hanza states that the optical devices 1 and 2 are mounted in the designated areas without requiring an effort to place them on their ideal positions, as shown in FIG. 1D. Note that the optical devices 1 and 2 in FIG. 1D do not include positioning members that are shaped to facilitate moving the lens with a fine positioning instrument.

The Applicants respectfully disagree with the Examiner's assertion made in connection with the rejection of claim 1 that it would have been obvious to a person having ordinary skill in the art to have the lenses be positionable so that they are aligned since Hanza discloses fabricating a mask to perfectly align optical elements. The methods and apparatus of direct write lithography described in Hanza that fabricate such masks are a very different and much more complicated and costly solution to the alignment problem of the subject application. There is no

need to have the positionable lens claimed in independent claim 1 if direct write lithography system can be used to align the waveguides to the optical components.

In addition, using the invention claimed in independent claim 1 as currently amended, alignments can be performed with relatively inexpensive and commonly available equipment in a non-clean room environment. That is, direct write lithography equipment and a clean room facility, which requires a multi-million dollar investment, are not necessary. This advantage is described in the specification. For example, paragraph 48 of the present specification states that the method of assembling a multi-source optical module according to the present invention can achieve very high optical coupling efficiency between the outputs of the first and second optical source and the inputs of the first and second optical waveguide with reduced size, lower cost, and higher reliability compared with known systems and subsystems.

Furthermore, the positioning member that is shaped to facilitate moving the lenses with a positioning instrument can be used to position the lenses in the vertical as well as the horizontal direction. This feature is described in paragraph 28 of the specification. The methods described in Hanza are two dimensional alignment techniques. Hanza, column 7 lines 24-27, does describes employing more than one stage of lithography to form tapered waveguides in the lateral and in the vertical dimension. However, the Applicants believe that such a technique performs multiple two-dimensional alignments to achieve the vertical structure.

According to the M.P.E.P. §2143.03 all claim limitations must be taught or suggested. This M.P.E.P. section states that all words in a claim must be considered in judging the patentability of the claim against the prior art. Hanza does not teach or suggest using a positioning member that is shaped to facilitate moving the lens with a positioning instrument.

Instead, Hanza teaches a different solution that does not require the lenses to be accurately positioned and, in fact, requires the lenses to be fixed (not positionable) so that they can be used as alignment structures for the direct write lithography.

Thus, the Applicants submit that the amendment to independent claim 1 and the forgoing arguments overcome the rejection under 35 U.S.C. §103(a) over Hanza. Therefore, the Applicants submit that independent claim 1 is allowable over Hanza and that dependent claims 2-15 are allowable as depending from an allowable base claim.

Independent Claim 16 and 25 and Dependent Claims 17-24

Independent claim 16 recites a method of manufacturing a multi-source optical module. Independent claim 16 has been amended to recite the step of positioning a first lens between an output of the first optical source and a first optical input of the optical circuit and positioning a second lens between an output of the second optical source and a second optical input of the optical circuit, wherein the first and the second lenses are positioned with a positioning member that is shaped to facilitate moving the lens with a positioning instrument.

The Applicants submit that the amendment to independent claim 16 and the forgoing arguments made in connection with the rejection of independent claim 1 overcome the rejection under 35 U.S.C. §103(a) over Hanza. Therefore, the Applicants submit that independent claim 16 is allowable over Hanza and dependent claims 17-24 are allowable as depending from an allowable base claim.

Independent Claim 25

Independent claim 25 recites a multi-source optical module. Independent claim 25 has been amended to include a means for positioning a first lens between an output of the first optical source and a first optical input of the optical circuit and for positioning a second lens between an output of the second optical source and a second optical input of the optical circuit, wherein the means for positioning includes a positioning member that is shaped to facilitate moving the lens with a positioning instrument.

The Applicants submit that the amendment to independent claim 25 and the forgoing arguments made in connection with the rejection of independent claim 1 overcome the rejection under 35 U.S.C. §103(a) over Hanza. Therefore, the Applicants submit that independent claim 25 is allowable over Hanza.

CONCLUSION

Claims 1-13 and 15-25 are pending in the present application. The Applicant respectfully requests reconsideration of the pending claims in light of the amendments and arguments presented in this Amendment and Response.

If, in the Examiner's opinion, a telephonic interview would expedite prosecution of the present application, the undersigned attorney would welcome the opportunity to discuss any outstanding issues, and to work with the Examiner toward placing the application in condition for allowance.

Respectfully submitted,

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